NCSP
NUCLEAR CRITICALITY SAFETY PROGRAM

Technical Program Review

March 18-19, 2015

LLNL-PRES-668295

New ICSBEP Evaluations

Dave Heinrichs
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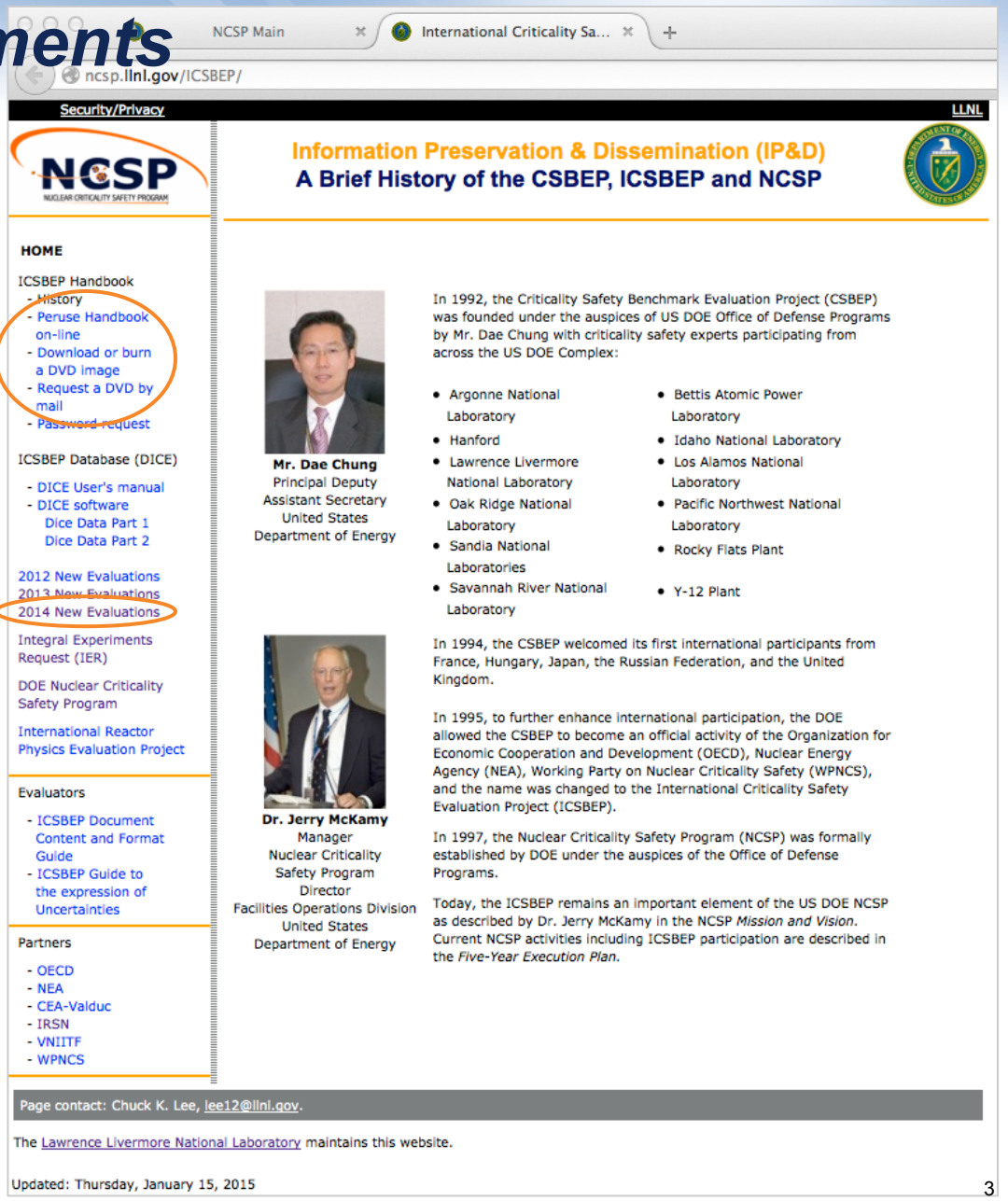
This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

Outline

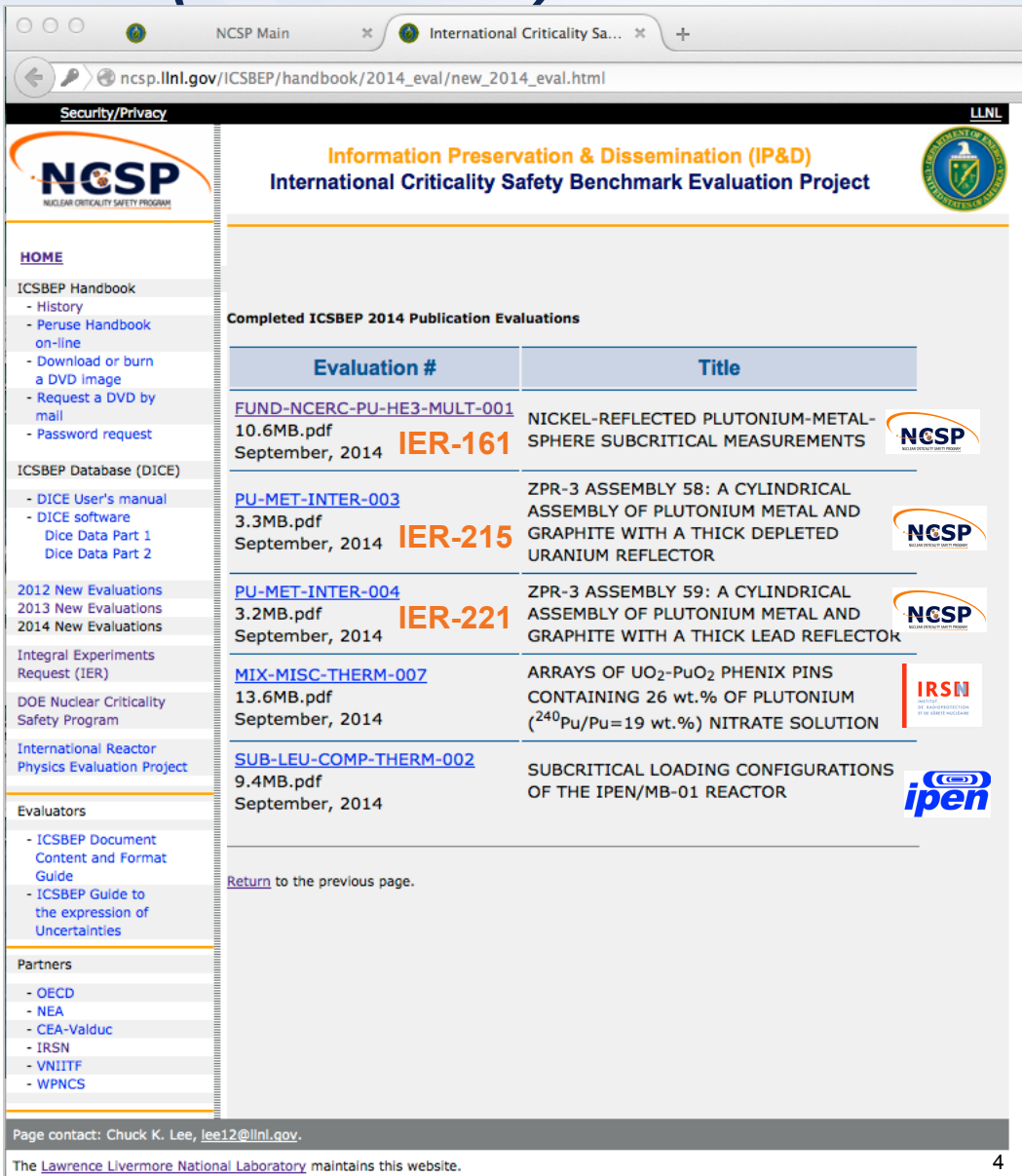
- FY-2014 accomplishments
- FY-2015 work in progress
- FY-2016 plans

FY2014 Accomplishments

- Updated on-line and down-loadable handbook versions
- Obtained DVDs from OECD which were mailed to all NCSP users (no need to re-request)
- DVDs contain DICE (requested by several NCSP users)
- 2014 New Evaluations identified for user convenience

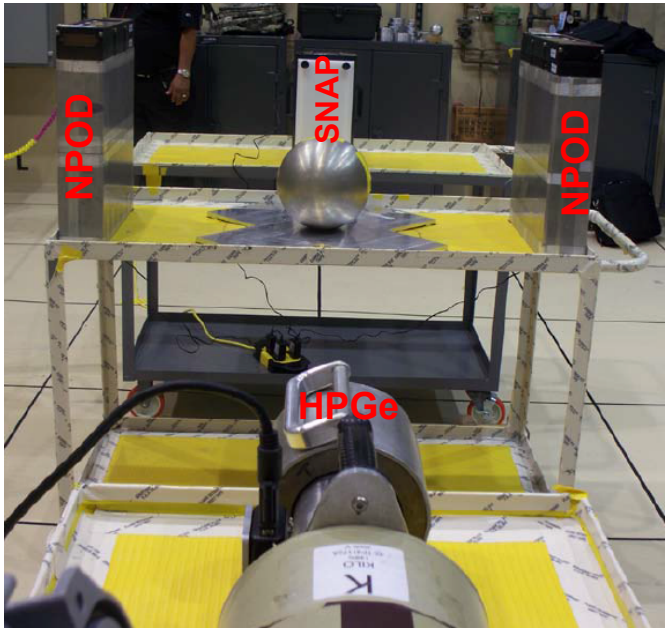


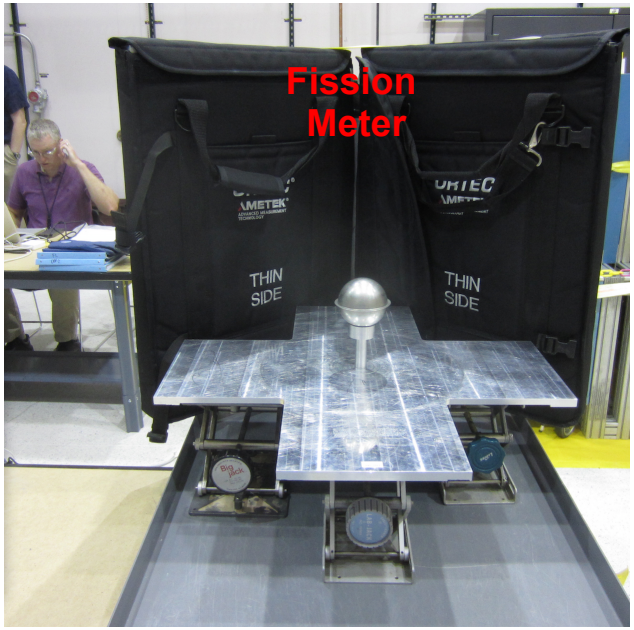
FY2014 Accomplishments (continued)



FUND-NCERC-PU-HE3-MULT-001

- Nickel-Reflected Plutonium Metal Sphere Subcritical Measurements (IER-161)
- 7 configurations reflected by 0, ½", 1", 1.5", 2", 2.5" and 3" of Ni
- Confirmatory measurements and analysis by LLNL (IER-263)





PU-MET-INTER-003

- ZPR-3 Assembly 58: A Cylindrical Assembly of Plutonium Metal and Graphite with a Thick Depleted Uranium Reflector

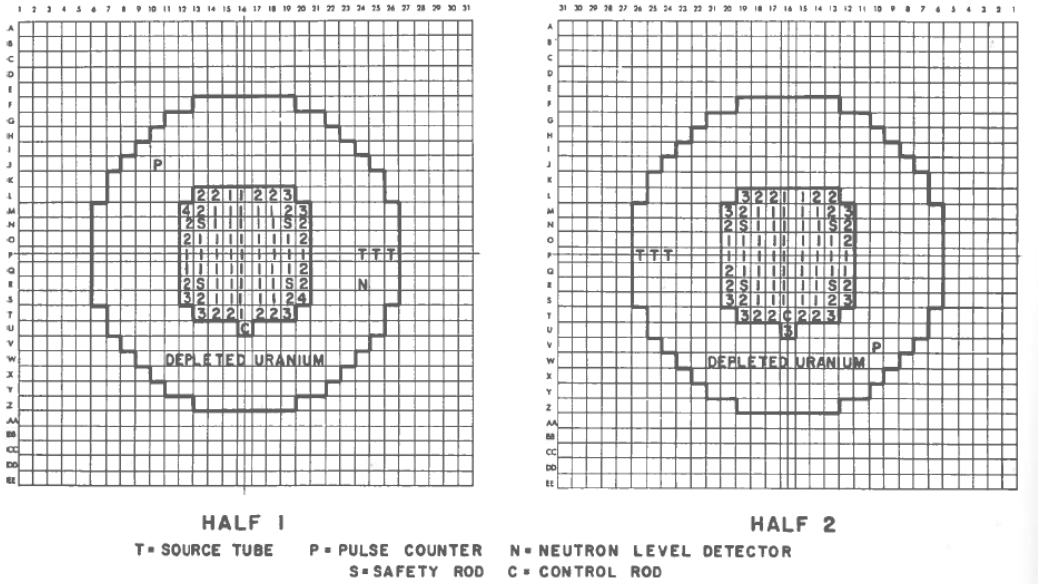


Fig. 2. Reference Core Loading for Assembly 58.
ANL Neg. No. ID-103-2988.

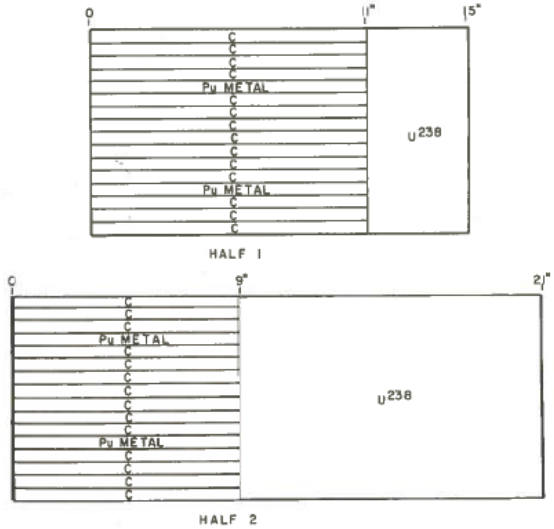


Fig. 1. Core Drawer Loading for Assembly 58.
ANL Neg. No. ID-103-2990.

Code	XS	As-Built k-eff	RZ Benchmark k-eff	Transformation Bias Δk-eff
MCNP5	ENDFB7.1 (NJOY)	1.00357(4)	0.98785(4)	-0.01572(6)
COG11.1	ENDFB7.1 (NJOY)	1.00326(5)	0.98495(3)	-0.01831(6)
COG11.1	ENDFB7.1 (PREPRO)	1.00482(3)	0.98682(3)	-0.01800(4)

Experimental k-eff = 1.0002 +/- 0.0015. Experimental k-eff = 0.9995 +/- 0.0015 when corrected to as-built model.

PU-MET-INTER-004

- ZPR-3 Assembly 59: A Cylindrical Assembly of Plutonium Metal and Graphite with a Thick Lead Reflector

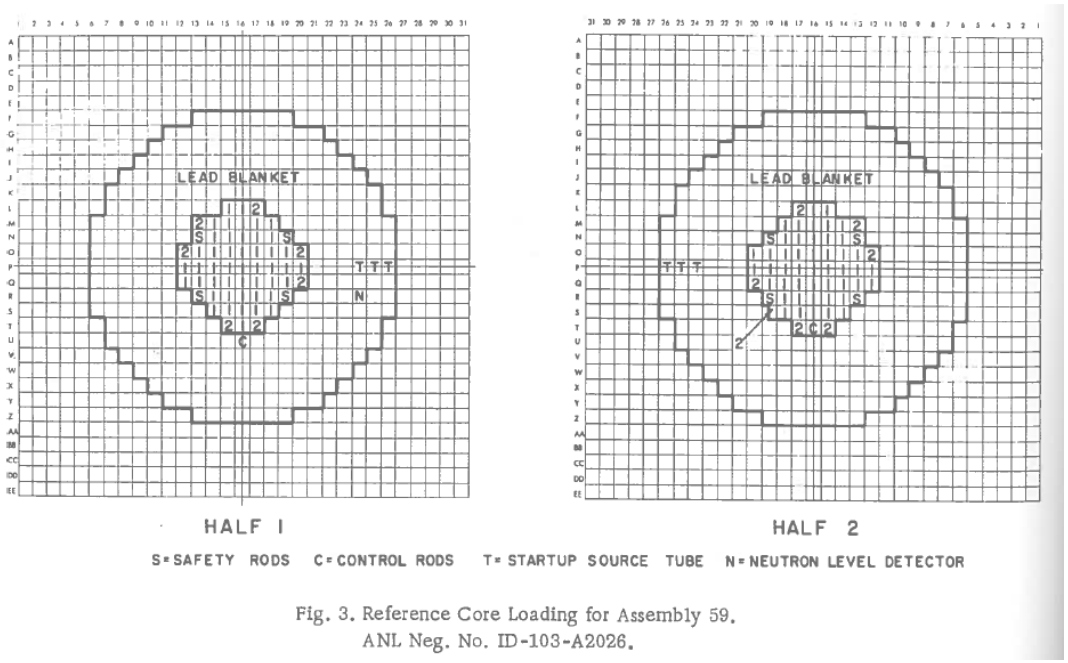


Fig. 3. Reference Core Loading for Assembly 59.
ANL Neg. No. ID-103-A2026.

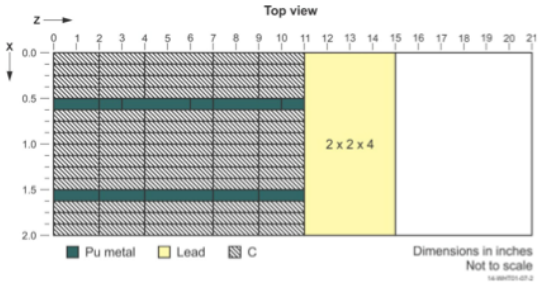


Figure 1-6. Loading Pattern for ZPR-3/59 Normal Core Drawer Master 59-1-100.

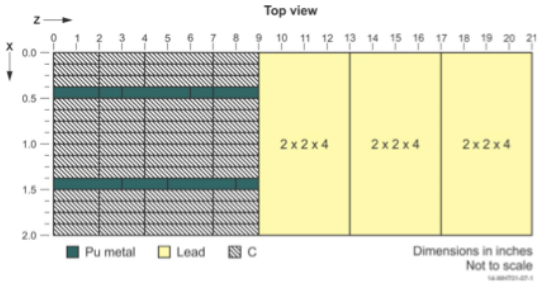


Figure 1-7. Loading Pattern for ZPR-3/59 Normal Drawer Master 59-2-100.

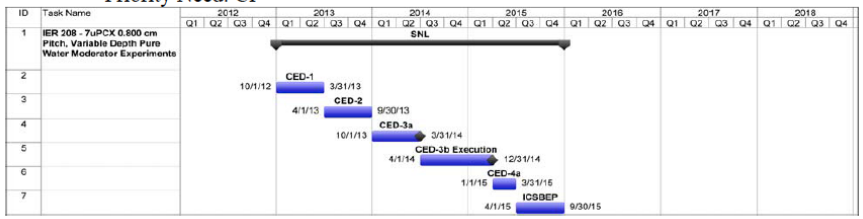
Code	XS	As-Built k-eff	XYZ Benchmark k-eff	Transformation Bias Δk-eff
MCNP5	ENDFB7.1 (NJOY)	0.99646(5)	0.97009(5)	-0.02637(7)
COG11.1	ENDFB7.1 (NJOY)	0.99662(7)	0.97039(3)	-0.02623(8)
COG11.1	ENDFB7.1 (PREPRO)	0.99858(5)	0.97250(3)	-0.02608(6)

Experimental k-eff = 1.0008 +/- 0.0020. Experimental k-eff = 0.9946 +/- 0.0024 when corrected to as-built model.

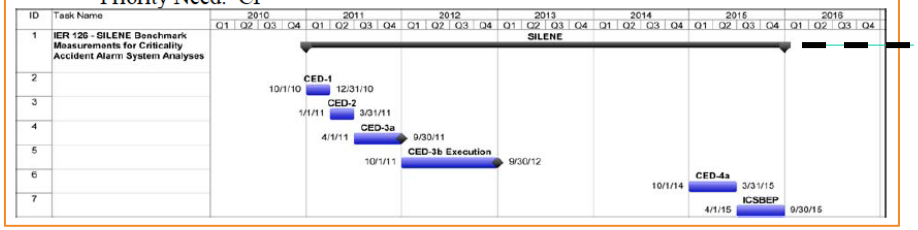
FY2015 Work in Progress

- Two new NCSP evaluations scheduled for ICSBEP 2015

A-3.2.1 IER 208: 7uPCX 0.800 cm Pitch, Variable Depth Pure Water Moderator Experiments (2013-1r)
Requestor: Gary A. Harms
C_EdT Lead: Gary A. Harms
Priority Need: CP



A-4.2.1 IER 126: SILENE Benchmark Measurements for Criticality Accident Alarm System Analyses (2011-1f)
Requestor: Thomas M. Miller
Primary Investigator: Thomas M. Miller
Priority Need: CP




NEA/NSC/DOC(95)03/IV
Volume IV

LEU-COMP-THERM-096

PARTIALLY-REFLECTED WATER-MODERATED SQUARE-PITCHED U(6.90)O_2 FUEL ROD LATTICES WITH 0.67 FUEL TO WATER VOLUME RATIO (0.800 CM PITCH)

Evaluator

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Internal Reviewer

John A. Miller
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Independent Reviewer

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Revision 0
Date: September 30, 2015


NEUTRON ACTIVATION AND THERMOLUMINESCENT DETECTOR RESPONSES TO A BARE PULSE OF THE CEA VALDUC SILENE CRITICAL ASSEMBLY

Evaluators

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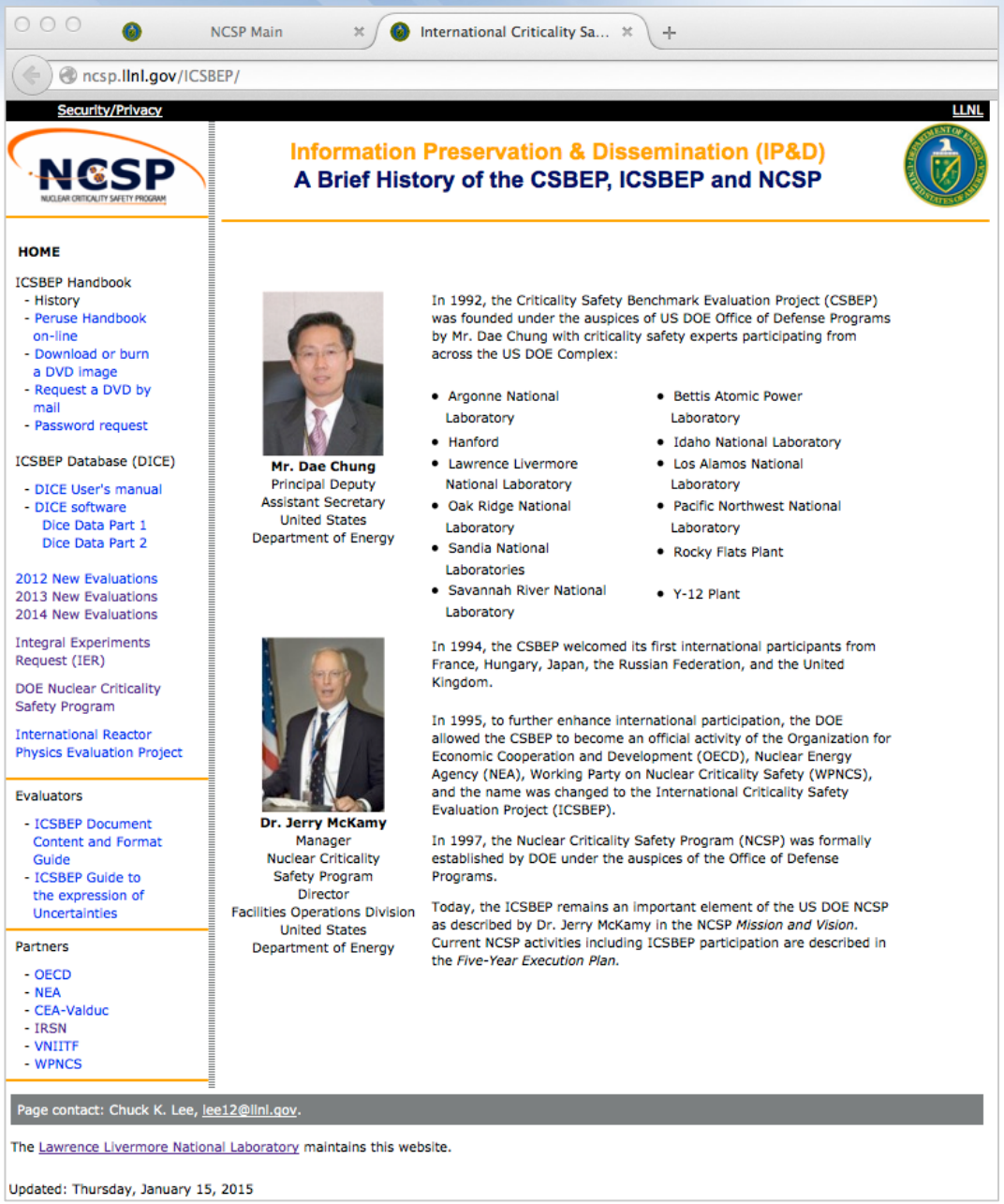
Plans for FY-2016

- New NCSP evaluations for FY-2016
  - IER126 (additional configurations)
  - IER151 (NCT #2)
  - IER160 (BeRP/W)
  - Flattop (supports IER252)
  - Class Foils with Lucite (supports ND and T&E)
  - Additional legacy evaluations (if funding available)
- Revisions to published evaluations
  - Reassessment of ZPR-6/10 uncertainties
  - Final Jezebel reevaluation
  - Godiva-IV errors

Questions?


NCSP Main
International Criticality Sa...
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LLNL
NCSP
NUCLEAR CRITICALITY SAFETY PROGRAM
HOME
ICSBEP Handbook
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ICSBEP Database (DICE)
- DICE User's manual
- DICE software
Dice Data Part 1
Dice Data Part 2
2012 New Evaluations
2013 New Evaluations
2014 New Evaluations
Integral Experiments Request (IER)
DOE Nuclear Criticality Safety Program
International Reactor Physics Evaluation Project
Evaluators
- ICSBEP Document Content and Format Guide
- ICSBEP Guide to the expression of Uncertainties
Partners
- OECD
- NEA
- CEA-Valduc
- IRSN
- VNIITF
- WPNCS
Information Preservation & Dissemination (IP&D)
A Brief History of the CSBEP, ICSBEP and NCSP
Mr. Dae Chung
Principal Deputy Assistant Secretary
United States Department of Energy
In 1992, the Criticality Safety Benchmark Evaluation Project (CSBEP) was founded under the auspices of US DOE Office of Defense Programs by Mr. Dae Chung with criticality safety experts participating from across the US DOE Complex:
Argonne National Laboratory
Hanford
Lawrence Livermore National Laboratory
Oak Ridge National Laboratory
Sandia National Laboratories
Savannah River National Laboratory
Bettis Atomic Power Laboratory
Idaho National Laboratory
Los Alamos National Laboratory
Pacific Northwest National Laboratory
Rocky Flats Plant
Y-12 Plant
Dr. Jerry McKamy
Manager
Nuclear Criticality Safety Program
Director
Facilities Operations Division
United States Department of Energy
In 1994, the CSBEP welcomed its first international participants from France, Hungary, Japan, the Russian Federation, and the United Kingdom.
In 1995, to further enhance international participation, the DOE allowed the CSBEP to become an official activity of the Organization for Economic Cooperation and Development (OECD), Nuclear Energy Agency (NEA), Working Party on Nuclear Criticality Safety (WPNCS), and the name was changed to the International Criticality Safety Evaluation Project (ICSBEP).
In 1997, the Nuclear Criticality Safety Program (NCSP) was formally established by DOE under the auspices of the Office of Defense Programs.
Today, the ICSBEP remains an important element of the US DOE NCSP as described by Dr. Jerry McKamy in the NCSP Mission and Vision. Current NCSP activities including ICSBEP participation are described in the Five-Year Execution Plan.
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The Lawrence Livermore National Laboratory maintains this website.
Updated: Thursday, January 15, 2015